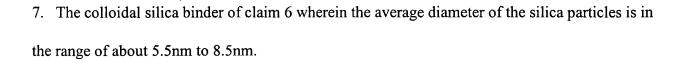
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## WHAT IS CLAIMED IS:

A binder for making an investment casting mold comprising a mixture of colloidal silicas, wherein the colloidal silicas have average particle size diameters of 4, 8 and 13 nanometers.

- 5 2. The binder of claim 1 wherein the 4 nanometer colloidal silica is present in the mixture in an amount of about 20% to about 70% by weight, the 8 nanometer colloidal silica is present in the mixture in an amount of about 10% to about 40% by weight and the 13 nanometer colloidal silica is present in the mixture in an amount of about 10% to about 40% by weight.
  - 3. The binder of claim 1 wherein the 4 nanometer colloidal silica is present in the mixture in an amount of about 44% by weight, the 8 nanometer colloidal silica is present in the mixture in an amount of about 28% by weight and the 13 nanometer colloidal silica is present in the mixture in an amount of about 28% by weight.
  - 4. The binder of claim 1 further comprising at least one polymer selected from the group consisting of latex polymers, water-soluble polymers and mixtures thereof.
  - 5. The binder of claim 4 wherein the polymer is present at a concentration between about 0.25 and about 20 weight percent.
  - 6. A colloidal silica binder for making an investment casting mold comprising silica particles, wherein at least 30% of the particles have average diameters less than about 4 nm and a solids content greater than about 15%.



- 8. The colloidal silica binder of claim 6 wherein about 90% of the silica particles have average
- 5 diameters in the range of about 2nm to about 16nm.